Community wide interventions for increasing physical activity
A Cochrane Systematic Review

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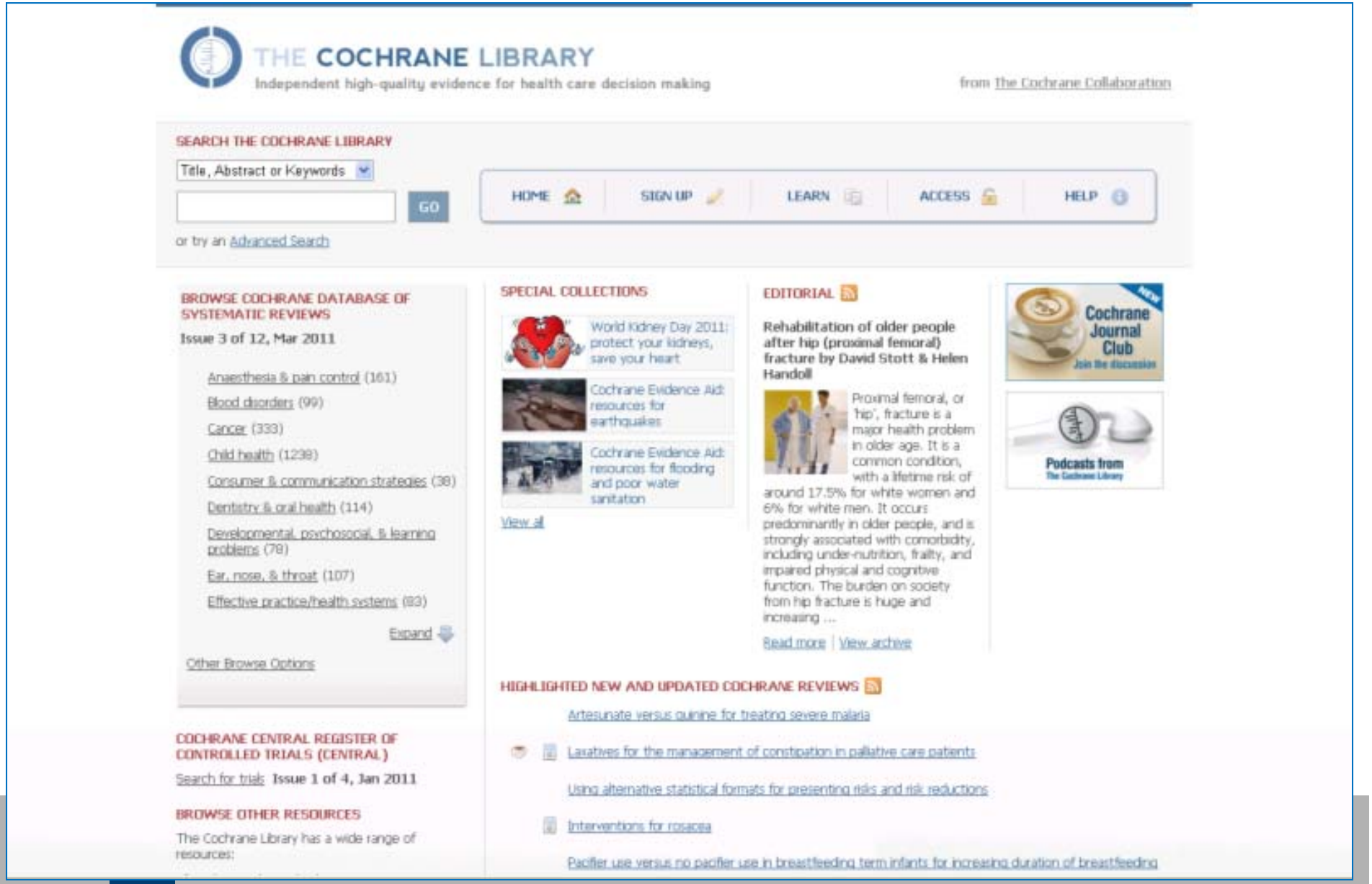
What is a Cochrane Systematic Review?

- Systematic reviews of primary research in human health care and health policy
- Are internationally recognised as the highest standard in evidence-based health care
- Investigate the effects of interventions for prevention, treatment and rehabilitation.
- Published online in The Cochrane Library.

www.thecochranelibrary.com



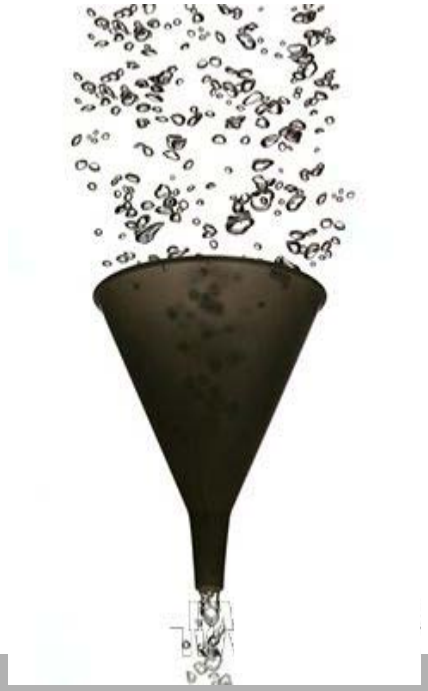
Key aspects of reviews

- Addresses a clearly formulated question
- All the existing primary research on a topic that meets certain criteria is searched for and collated,
- Assessed using stringent guidelines, to establish whether or not there is conclusive evidence about a specific treatment.
- Updated regularly, most up-to-date and reliable evidence.

Systematic reviews are essential!

- Summarise results of a range of research studies on a specific topic into a single report
- Key stages:
  1. Identify relevant studies
  2. Assess their quality
  3. Analyse/summarise the evidence
- Role:
  - Key source of evidence based information to support and develop policy and practice
  - State of knowledge in an area
  - Identify gaps in knowledge

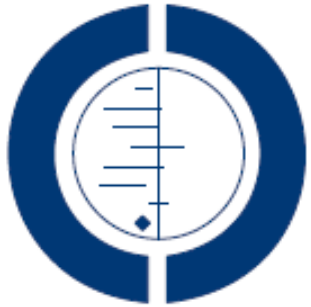
Source: Cochrane Public Health Group



Reference:Baker PRA, Francis DP, Soares J, Weightman AL, Foster C. Community wide interventions for increasing physical activity. Cochrane Database of Systematic Reviews 2011, Issue 4. Art. No.: CD008366. DOI: 10.1002/14651858.CD008366.pub2.

Community wide interventions for increasing physical activity (Review)

Baker PRA, Francis DP, Soares J, Weightman AL, Foster C



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Review of Community wide interventions for increasing physical activity

- Not having enough physical activity leads to poorer health
- Regular physical activity can reduce the risk of chronic disease and improve one's health and well being
- Important for reducing the overall burden of disease

Public Health questions

- Do community wide, multi-strategic interventions increase community levels of physical activity?
- Are the effects different within and between populations?
- Is there an equity gradient?

Summary Statement:

Baker(2011)

- P General population, i.e. communities.
- I Community wide, multi-strategic interventions with at least two strategies aimed at promoting physical activity.
- C Usual practice.
- O Population levels of physical activity.

Quality Rating: 9 (strong) www.healthevidence.org

Included interventions:

Multi-strategic interventions that aim to reach the whole community, which must have included at least 2 of a possible 6 components:

- social marketing;
- other communication strategies;
- individual counselling by health practitioners;
- partnerships with government or non-government groups;
- working in specific settings; and
- environmental change strategies.

What we set out to do…

- Systematic
- Comprehensive
- Objective
- Transparent

What studies did we include?

- **Participants / Population:** A whole community as defined by geographical boundary.
- **Comparison:** No community wide interventions.
- **Primary outcome:** physical activity.
- **Studies:** Randomized (cluster) trials, quasi-experimental controlled designs, and interrupted time-series studies.
- **Duration**: ≥ 6 months

How did we do it?

- Searches were carried out in 24 databases including, the Cochrane Central Register of Controlled Trials, MEDLINE, PubMed, EMBASE and several other electronic databases. Six Chinese language databases were also included.

- Risk of bias for included studies was assessed (6; then H/M/L)

- For dichotomous measures, net percentage change from baseline, adjusted risk difference, and adjusted relative risk were calculated.

- For continuous measures, post mean differences, adjusted mean difference and adjusted percentage change relative to control group were calculated.

What's the evidence?
Outcomes reported in the review

- Dichotomous outcomes
  - % Physical activity
  - % Not sedentary
  - % Leisure time physical activity
- Continuous outcomes
  - Time physically active
  - Walking
  - METs (energy expenditure)

What the review found

- There was much variation in interventions, population and outcomes.
- The results of the studies themselves were inconsistent, making it especially difficult to identify the key, reliable findings.
- Few studies reported a substantial or sustained increase in physical activity
- There was no evidence that more intense interventions worked better then others.

Study characteristics - 1

Study	Study Design	Community	Target Behaviour
Brown 2006	Controlled before and after study	Regional city	Physical activity
Brownson 2004	Controlled before and after study	Rural communities	Physical activity
Brownson 2005	Controlled before and after study	Rural communities	Physical activity
De Cocker 2007	Controlled before and after study	Urban communities	Physical activity
Eaton 1999	Controlled before and after study	City	CVD risk factors
Goodman 1995	Controlled before and after study	Urban city	Chronic disease prevention
Gu 2006	Controlled before and after study	Rural villages	CVD risk factors
Guo 2006	Controlled before and after study	Rural villages	Physical activity
Jenum 2006	Controlled before and after study	Districts of Oslo	Physical activity
Jiang 2008	Controlled before and after study	Urban communties	Prevention of Hypertension
Kloek 2006	Controlled cluster before and after study	Urban neighbourhoods	CVD risk factors
Kumpusalo 1996	Controlled cluster before and after study	Rural villages	Healthy lifestyles
Luepker 1994	Controlled Interrupted Time series	Rural townships	CVD risk factors
Lupton 2003	Controlled before and after study	Regional villages	CVD risk factors
Nafziger 2001	Controlled before and after study	Counties	CVD risk factors

Study characteristics - 2

Study	Study Design	Community	Target Behaviour
Nishtar 2007	Controlled before and after study	Districts	CVD risk factors
NSW Health 2002	Controlled before and after study	Urban suburbs	Physical activity
O'Loughlin 1999	Controlled cohort study	Inner city neighbourhoods	CVD risk factors
Osler 1993	Controlled before and after study	Rural municipalities	CVD risk factors
Reger-Nash 2005	Controlled before and after study	Cities	Physical activity
Sarrafzadegan 2009	Controlled before and after study	Cities	CVD risk factors
Simon 2008	Cluster randomised controlled trial	School catchment areas	CVD risk factors
Wendel-Vos 2009	Controlled before and after study	Cities	Healthy lifestyle
Young 1996	Controlled before and after study	Cities	CVD risk factors
Zhang 2003	Controlled before and after study	Communities in Shandong	Diabetes risk factors

What the review found

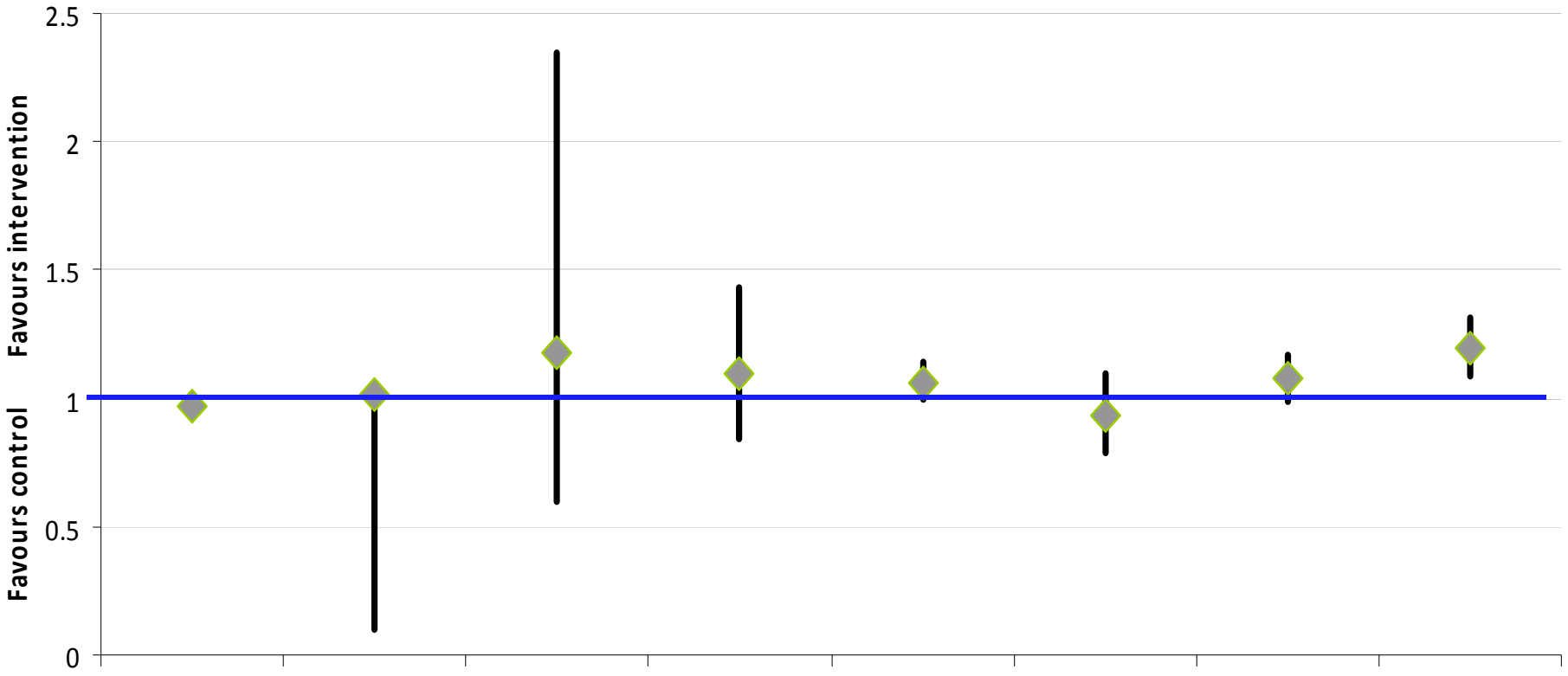
Countries of origin

USA	8	Demark	1
China	4	Finland	1
Australia	2	France	1
Netherlands	2	Iran	1
Norway	2	Pakistan	1
Canada	1		
Belgium	1		

What the review found included strategies

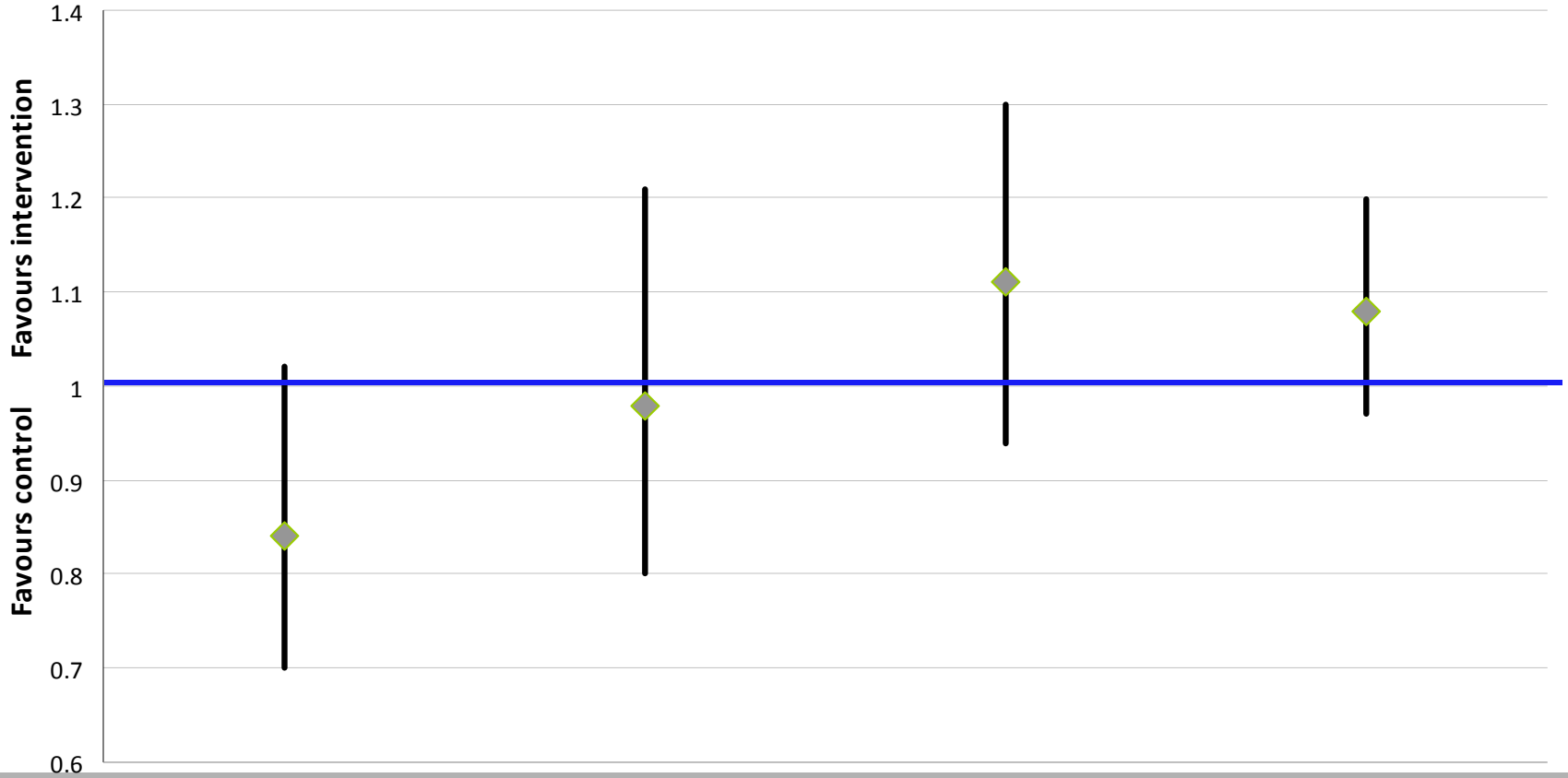
- Building partnership (22 studies)
- Some form of counselling (18)
- Mass media (15)
- Other communication (18)
- Specific settings (11)
- Environmental change strategies (10)

Dichotomous outcomes – Physical activity

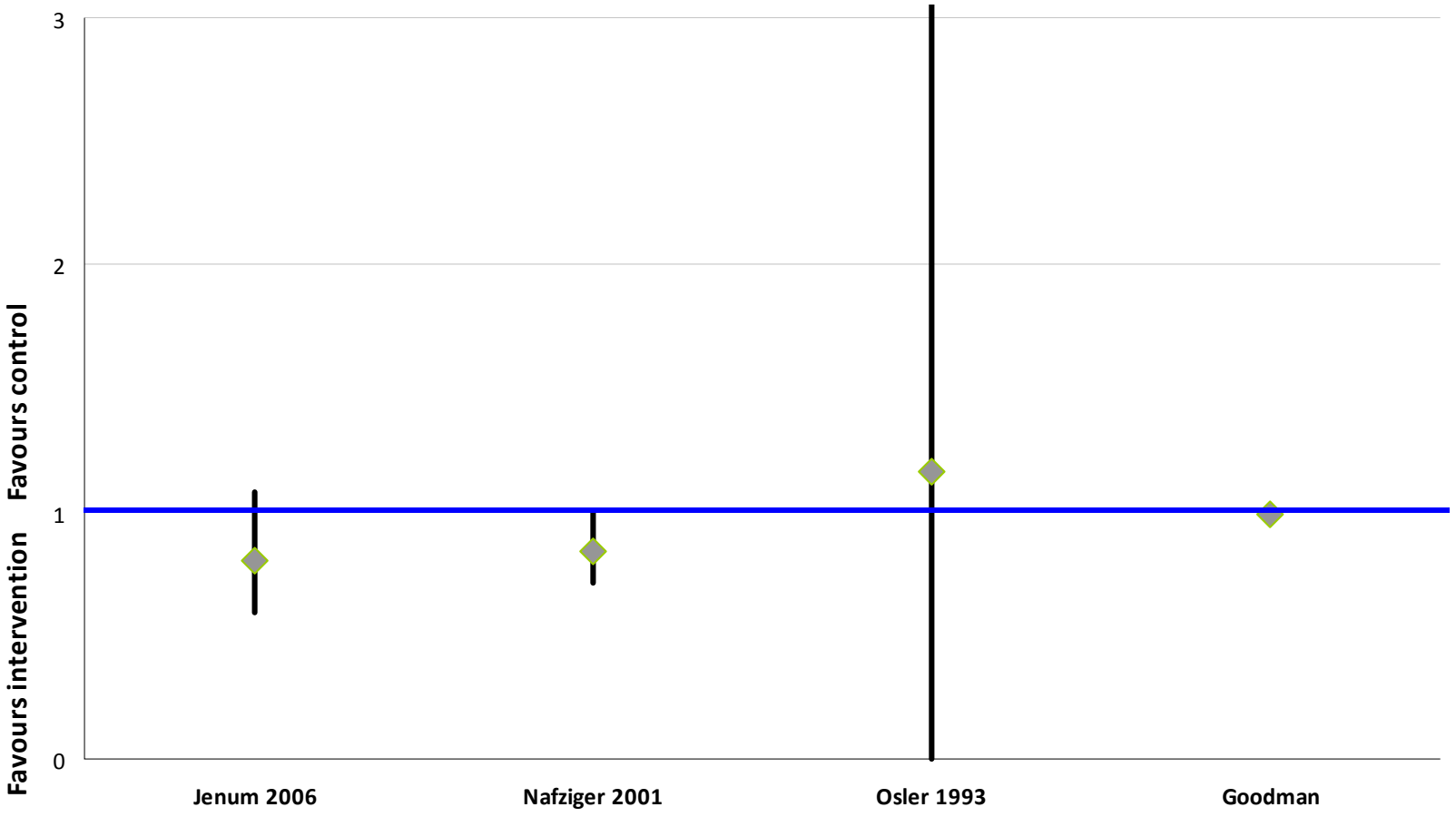


Dichotomous outcomes –

Physical activity during leisure time



Dichotomous outcomes – Sedentary or physically inactive



Continuous outcomes

- 7 included studies
- 3 showing some evidence (DeCocker 2007 (women), Simon 2008, Wendel-Vos 2009
- Measured a against background decreasing PA levels
- Continuous measures more useful

Continuous measures – Leisure time spent PA

Study	Measure (labelled)	Subgroups	Post-mean difference	Adjusted mean difference	Adjusted % change relative to the control mean
Wendel-Vos 2009	Leisure time PA (hours/wk)	Men	-0.2	-0.4	-2.06
		Women	-0.7	2.2	14.01 (P≤0.5)
DeCocker 2008	Leisure time PA (min/week)	Leisure time PA	0	32	25.60 (P≤0.05)
Simon 2008	Supervised leisure time PA (hours/week)	Children only measured	0.9	1.1	43.14 (P<0.0001)

Continuous outcomes walking

Study	Measure (labelled)	Sub-groups	Post mean difference	Adjusted mean difference	Adjusted % change relative to the control mean
Wendel-Vos 2009	Walking (hours/week)	Men	1.8	1.1	15.94 NS
		Women	1.8	2.0	29.41 NS
DeCocker 2007	Walking (min/week)	Walking	34	47	17.34 ($P \leq 0.05$)
Brownson 2005	Walking (mean min/week)	N/A	-0.8	5.2	4.75 NS
Brownson 2004	7 day total walking (mean min/week)	N/A	-5.3	-1.4	-1.38 NS

Continuous outcomes – Energy expenditure METs

Study	Measure (labelled)	Post mean difference	Adjusted mean difference	Adjusted % change relative to the control mean
Sarrafzegan 2009	Total daily PA (MET – m/week ±SD)	32	46	9.09 (P<0.05)
	Leisure time PA (MET-m/week)	14	13	12.26 (P<0.01)
Kloek 2006	METs/week	81	-241	-3.54 (P=0.95)

High intensity studies

Of the 9 studies assessed of high intensity

- 5 of these reported some improved PA outcomes
- 3 of these found no effects
- Some high intensity interventions not appropriate for western settings

Environmental – possible?

- Brown -2006 (wide range) womer ✓
- Brownson 2004 (walking trails) ✗
- De Cocker 2007 (signage) ✓
- Eaton 1999 (trails, paths) ✗
- Goodman 1995 (walking trails) ✗
- Jenum 2006 (approaches) maybe
- Leupker 1994 (change) ✓
- NSW Health 2002 (parks) maybe
- O'Loughlin 1999 (minimal) ✗
- Simon 2008 (various) ✓

Overall Considerations

- Insufficient evidence, most included studies at high risk of bias. Serious issues in the design affecting their trustworthiness
- There may be efficacious approaches
- Different interventions seemed to reach different segments of the population.
- Some studies showed positive effect, others decreased or no effect
- High intensity interventions did not necessary result in more effective interventions

General Implications

Public health should promote/support/implement:

- Can not assume combining interventions will yield a measurable health outcome.
- Should not group label “evidence-based”.
- There is a need for more robust studies to investigate community wide interventions. Need to measure PA accurately, continuous measures best.
- New studies should be rigorously designed and analysed and should include process evaluations
- Consider individual components e.g. School-based


Big task to improve Physical Activity levels!